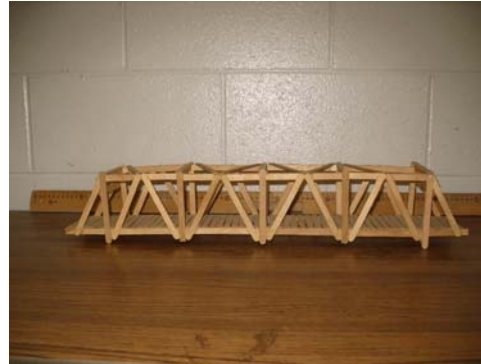


POPSICLE STICK BRIDGE CONTEST



The Challenge

Your challenge is to build a bridge that meets the following criteria.

- You must construct a bridge made of popsicle sticks and carpenters glue. No other materials may be used. Standard popsicle sticks are 11.5 cm long, 1 cm wide, and approximately 0.2 cm thick.
- The bridge must span a gap of 60 cm (so make it about 70 cm long so that there's support at either end).
- The bridge must not weigh more than 500 grams.
- The bridge must have a smooth continuous driving deck that spans the entire length of the bridge. This deck must be unobstructed and 8cm wide.
- The load will be applied to the deck of the bridge by means of a rope or strap that will hold the weight below the bridge. An opening of 40 mm by 10 mm should be left at or near the middle of the deck to allow the strap (see below).



- You must incorporate structural elements learned in class (e.g., laminated beams, trusses, sway-bracing, etc.)
- You will be asked to discuss the design elements used in your bridge at the end of the project.

Bridge Questions

1. Identify and discuss the design elements that you incorporated into your bridge. Your explanations as to why you chose each element should be quite detailed. Set them up as shown below.

Design Element: (provide a description of the design element)

Why I chose to use this design element: (provide an explanation as to how and why you thought this design element would improve your structure)

2. Identify and describe at least three of the common design elements among the bridges that successfully supported 100 lbs.? Why were these design elements so effective? Set up each of your three answers as shown below.

Design Element: (provide a description of the design element)

Why this design element was so effective: (provide an explanation as to why this design element was so effective)

3. Identify and explain at least three improvements that you could make to your bridge, or things that you could do differently, so that it would meet the design criteria more effectively. This could include a discussion of design elements, use of materials, time management, parental or partner support, etc.

Bridge Design Rubric

Criteria	Level 1	Level 2	Level 3	Level 4
Weight Held	50 - 60 lbs.	61 - 70 lbs.	71 - 80 lbs.	81 - 100 lbs.
Ratio of weight held to bridge weight	less than 80:1	80:1 to 90:1	90:1 to 112:1	greater than 113:1
Design Elements -incorporates the design elements (beams, trusses, triangles, braces) learned in class	-incorporates few to no design elements learned in class -design elements are ineffective	-incorporates a few of the design elements learned in class -design elements are not always used effectively	-incorporates a number of design elements learned in class -some design elements are used effectively	-incorporates many design elements learned in class, or elsewhere -design elements are used in an effective and efficient manner
Use of Materials and Aesthetic Appeal -the bridge is symmetrical -the materials have been used neatly and effectively	-bridge lacks symmetry -most of the materials are put together ineffectively and are sloppy	-bridge is almost symmetrical -some of the materials are put together ineffectively and are sloppy	-bridge is symmetrical -most of the materials are put together neatly and effectively	-bridge is symmetrical -materials are put together in a neat and highly efficient manner
Discussion of Design Elements -students is able to discuss how and why they used certain design elements	-the student demonstrates little understanding of the design elements used in their bridge	-the student demonstrates some understanding of the design elements used in their bridge	-the student demonstrates a considerable understanding of the design elements used in their bridge	-the students demonstrates a thorough understanding of the design elements used in their bridge
Discussion of Design Elements -student is able to discuss the design elements common to bridges holding 100 lbs.	-the student demonstrates little understanding of the design elements common to bridges holding 100 lbs.	-the student demonstrates some understanding of the design elements common to bridges holding 100 lbs.	-the student demonstrates considerable understanding of the design elements common to bridges holding 100 lbs.	-the student demonstrates a thorough understanding of the design elements common to bridges holding 100 lbs.
Reflection -students provides a thorough reflection about the project	-student provides little reflection about design elements, use of materials, or ways to improve the project	-student provides some reflection about design elements, use of materials, or ways to improve the project	-student provides a thoughtful reflection about design elements, use of materials, or ways to improve the project	-students provides and thoughtful and thorough reflection about the design elements, use of materials, or ways to improve the project